

CLAIMS

1. A write-once-type recording medium comprising:

a data area to record therein record data;

5 a control information recording area to record therein information for controlling an operation of recording and/or reading in said data area, said control information recording area including a definite defect management area to record therein defect management information of said data area; and

10 a temporary defect management area to temporarily record therein the defect management information of said data area, said temporary defect management area being placed between said control information recording area and said data area.

15 2. The write-once-type recording medium according to claim 1, wherein said temporary defect management area is a first temporary defect management area placed between (i) said control information recording area placed on an inner circumferential side of said data area and (ii) said data area.

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3. The write-once-type recording medium according to claim 1, wherein said temporary defect management area is a second temporary defect management area placed between (i) said control information recording area placed on an outer circumferential side
25 of said data area and (ii) said data area

4. The write-once-type recording medium according to claim 1, wherein said temporary defect management area is large enough to record therein the defect management information of said data area a plurality of times repeatedly.

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5. The write-once-type recording medium according to claim 1, wherein said data area includes a spare area for evacuating the record data from a defect.

10 6. A recording apparatus for recording record data onto a write-once-type recording medium comprising: (i) a data area to record therein the record data; (ii) a control information recording area to record therein information for controlling an operation of recording and/or reading in said data area, said control information
15 recording area including a definite defect management area to record therein defect management information of said data area; and (iii) a temporary defect management area to temporarily record therein the defect management information of said data area, said temporary defect management area being placed between said
20 control information recording area and said data area,

said recording apparatus comprising:

a first recording device for recording the record data into said data area;

a memory device for storing therein the defect management
25 information;

a second recording device for recording the defect

management information stored in said memory device, into said temporary defect management area; and

a third recording device for recording the defect management information stored in said memory device, into said definite defect
5 management area.

7. The recording apparatus according to claim 6, wherein the defect management information includes:

definition information for indicating a position of said data
10 area; and

a defect list including (i) defect position information for indicating a position of a defect in the said data area and (ii) spare area position information for indicating a position of a spare area at which the record data to be recorded at the position of the defect is
15 alternatively recorded.

8. The recording apparatus according to claim 6, further comprising:

a first defect-management-information generating device for
20 generating the defect management information with respect to said write-once-type recording medium, on which the record data is unrecorded, and storing the generated defect management information into said memory device; and

a first recording control device for controlling said second
25 recording device to record the defect management information into said temporary defect management area in case that the defect

management information is generated by said first defect-management-information generating device.

9. The recording apparatus according to claim 6, further
5 comprising:

a second defect-management-information generating device for generating or updating the defect management information and storing the generated or updated defect management information into said memory device, in case that the record data is recorded by
10 said first recording device into said data area; and

a second recording control device for controlling said second recording device to record the defect management information into said temporary defect management area in case that the defect management information is generated or updated by said second
15 defect-management-information generating device.

10. The recording apparatus according to claim 9, further comprising:

a defect-management-information obtaining device for
20 reading the defect management information from said temporary defect management area on said write-once-type recording medium, on which the defect management information is recorded in said temporary defect management area, and storing the read defect management information into said memory device,

25 wherein

said second defect-management-information generating

device updates the defect management information, which is stored by said defect-management-information obtaining device in said memory device, in case that the record data is recorded by said first recording device into said data area, and

5 said second recording control device records the defect management information into said temporary defect management area in case that the defect management information is updated.

11. The recording apparatus according to claim 8, wherein said
10 first or second defect-management-information generating device comprises:

 a defect detecting device for detecting a defect in the said data area; and

 a spare area reserving device for reserving a spare area
15 corresponding to the defect in said data area.

12. The recording apparatus according to claim 6, further comprising:

 a finalize-command device for giving a command for
20 indicating to finalize said write-once-type recording medium; and

 a third recording control device for controlling said third recording device to record the defect management information stored in said memory device, into said definite defect management area in case that the command for indicating to finalize is given by
25 said finalize-command device.

13. The recording apparatus according to claim 12, wherein said finalize-command device gives the command for indicating to finalize in response to an eject command.

5 14. The recording apparatus according to claim 6, wherein said second recording device records the defect management information a plurality of times repeatedly in said temporary defect management area.

10 15. The recording apparatus according to claim 6, wherein said third recording device records the defect management information a plurality of times repeatedly in said definite defect management area.

15 16. The recording apparatus according to claim 6, wherein said second recording device redundantly records the defect management information in a plurality of temporary defect management areas present at a plurality of points respectively on said write-once-type recording medium.

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17. The recording apparatus according to claim 6, wherein said third recording device redundantly records the defect management information in a plurality of definite defect management areas present at a plurality of points respectively on said write-once-type
25 recording medium.

18. The recording apparatus according to claim 6, further comprising an area setting device for setting an areal size of said temporary defect management area and setting the position of said data area depending on the set areal size of said temporary defect
5 management area.

19. A reproducing apparatus for reproducing record data recorded on a write-once-type recording medium comprising: (i) a data area to record therein the record data; (ii) a control
10 information recording area to record therein information for controlling an operation of recording and/or reading in said data area, said control information recording area including a definite defect management area to record therein defect management information of said data area; and (iii) a temporary defect
15 management area to temporarily record therein the defect management information of said data area, said temporary defect management area being placed between said control information recording area and said data area,

said reproducing apparatus comprising:

20 a memory device;

a first reading device for reading the defect management information recorded in said temporary defect management area and storing the read defect management information into said memory device; and

25 a reproducing device for reproducing the record data recorded in said data area on the basis of the defect management information

stored in said memory device.

20. The reproducing apparatus according to claim 19, wherein the defect management information includes:

5 definition information for indicating a position of said data area; and

a defect list including (i) defect position information for indicating a position of a defect in the said data area and (ii) spare area position information for indicating a position of a spare area at
10 which the record data to be recorded at the position of the defect is alternatively recorded.

21. The reproducing apparatus according to claim 19, comprising:

a finalize-detecting device for detecting whether or not said
15 write-once-type recording medium is already finalized;

a second reading device for reading the defect management information recorded in said definite defect management area and storing the read defect management information into said memory device; and

20 a reading control device for (i) controlling said second reading device to read the defect management information recorded in said definite defect management area and storing the read defect management information into said memory device in case that it is detected that said write-once-type recording medium is already
25 finalized and (ii) controlling said first reading device to read the defect management information recorded in said temporary defect

management area and storing the read defect management information into said memory device in case that it is detected that said write-once-type recording medium is not finalized yet, on the basis of a detection result by said finalize-detecting device.

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22. A computer program of instructions for tangibly embodying a program of instructions executable by a computer to make the computer function as a recording apparatus according to claim 6.

10 23. A computer program of instructions for tangibly embodying a program of instructions executable by a computer to make the computer function as a reproducing apparatus according to claim 19.

24. A recording method of recording record data onto a
15 write-once-type recording medium comprising: (i) a data area to record therein the record data; (ii) a control information recording area to record therein information for controlling an operation of recording and/or reading in said data area, said control information recording area including a definite defect management area to
20 record therein defect management information of said data area; and (iii) a temporary defect management area to temporarily record therein the defect management information of said data area, said temporary defect management area being placed between said control information recording area and said data area,

25 said recording method comprising:

a first recording process of recording the record data into

said data area;

a defect-management-information generating process of generating or updating the defect management information;

5 a second recording process of recording the defect management information generated or updated in said defect-management-information generating process, into said temporary defect management area;

a finalize-command process of giving a command for indicating to finalize said recording medium; and

10 a third recording process of recording the defect management information generated or updated in said defect-management-information generating process, into said definite defect management area in case that the command for indicating to finalize is given in said finalize-command process.

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25. A reproducing method of reproducing record data recorded on a write-once-type recording medium comprising: (i) a data area to record therein the record data; (ii) a control information recording area to record therein information for controlling an operation of recording and/or reading in said data area, said control information recording area including a definite defect management area to record therein defect management information of said data area; and (iii) a temporary defect management area to temporarily record therein the defect management information of said data area, said temporary defect management area being placed between said control information recording area and said data area,

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said reproducing method comprising:

a detecting process of detecting whether or not said recording medium is already finalized;

5 a first reading process of reading the defect management information recorded in said temporary defect management area and storing the read defect management information into said memory device in case that it is detected that said write-once-type recording medium is not finalized;

10 a second reading process of reading the defect management information recorded in said definite defect management area and storing the read defect management information into said memory device in case that it is detected that said write-once-type recording medium is already finalized; and

15 a reproducing process of reproducing the record data recorded in said data area on the basis of the defect management information stored in said memory device.